Green Economy: Opportunities and Challenges for Indonesia and Indo-Pacific Countries

Taufan Herdansyah Akbar[1], Rakha Aditya Putra[1],

[1]International Relations Department, Jenderal Achmad Yani University, Indonesia.

Email: Taufanakbar10@gmail.com, Rakha.adityaputra30@gmail.com

Abstract. The global imperative to transition towards a green economy has evolved from a conceptual discourse, as defined by UNEP, to a series of binding international commitments, from the 1972 Stockholm Conference to the landmark COP28 agreement to move away from fossil fuels. This paper examines this paradigm shift, focusing on its implementation and implications within the dynamic Indo-Pacific region. It highlights how major economies are institutionalizing this transition through robust policies, such as Japan's Green Growth Strategy, South Korea's Green New Deal, and Indonesia's Just Energy Transition Partnership (JETP). As a focal point, Indonesia presents a compelling case study, endowed with world-class renewable energy potential, including an estimated 207.8 GW from solar, 75 GW from hydro, and 29 GW from geothermal sources, and the world's largest nickel reserves, critical for green technologies. Despite this potential, the nation confronts significant hurdles, including infrastructure deficits, investment challenges, and a persistent reliance on fossil fuels. This paper argues that the critical question is no longer if the transition should occur, but how and how fast it can be achieved. It concludes by recommending strategic actions centered on accelerating investment, fostering cross-border policy synergy, and enhancing human capital to overcome these challenges.

Keywords: Green Economy, Indo-Pacific, Indonesia, Renewable Energy, Energy Transition.

Introduction

The global policy landscape is undergoing a profound transformation, marked by a decisive pivot towards the green economy. This paradigm, first formally articulated in the 1989 Blueprint for a Green Economy report (Pearce, Markandya, & Barbier, 1989), has evolved from a niche concept into a central organizing principle for 21st-century development. The United Nations Environment Programme (UNEP) provides the most authoritative definition, describing a green economy as one that "results in improved human well-being and social equity, while significantly reducing environmental risks and ecological scarcities" (UNEP, 2011). In its simplest expression, it is an economy that is low-carbon, resource-efficient, and socially inclusive (UNEP, 2011). This shift has been catalyzed by a series of international milestones, from the foundational 1972 Stockholm Conference to the recent COP28 agreement, which established a global consensus to transition away from fossil fuels, solidifying the green economy as a binding international commitment. It is now widely recognized that achieving long-term sustainability rests almost entirely on "getting the economy right" through targeted investments, technological innovation, and comprehensive policy reforms (European Environment Agency, 2011). Nowhere is this transition more critical or more complex than in the Indo-Pacific. The region is a global nexus of economic dynamism and demographic weight, accounting for approximately 60% of the world's population and 40% of global GDP (Council on Energy, Environment and Water, 2023). Its demand for energy is projected to nearly double by 2050, making its development trajectory a determinative factor in the global energy landscape (Council on Energy, Environment and Water, 2023). Simultaneously, the Indo-Pacific is acutely vulnerable to the impacts of climate change, with 14 of the world's 20 most at-risk countries located within its boundaries (Agence Française de Développement, 2024). This convergence of rapid growth, escalating energy needs, and profound climate risk positions the Indo-Pacific as the pivotal arena where the success or failure of the global green economy transition will be decided (Bowen, 2022).

This paper aims to critically analyze the opportunities and challenges of this transition within the Indo-Pacific. It employs a comparative approach, examining the institutionalized policy models of Japan and South Korea as regional benchmarks before conducting an in-depth case study of Indonesia. The central argument, derived from the abstract, is that the critical question facing the region is no longer if the transition should occur, but how and how fast it can be achieved amidst formidable structural, financial, and geopolitical complexities. The paper is structured to first analyze the advanced policy frameworks in the region, then delve into the Indonesian paradox of potential versus reality, and conclude with strategic recommendations for accelerating a viable and just transition.

Methods

This research utilizes a qualitative research methodology, centered on a comparative case study approach. The research design is tailored to provide a deep, contextualized analysis of the green economy transition in the Indo-Pacific, with a specific focus on Indonesia. The primary data for this paper are drawn exclusively from a comprehensive of secondary sources. These include official government policy documents, such as Japan's Green Growth Strategy, South Korea's Green New Deal, and Indonesia's Comprehensive Investment and Policy Plan (CIPP) for the Just Energy Transition Partnership (JETP). This is supplemented by an extensive review of reports from multilateral institutions, including the World Bank, Asian Development Bank (ADB), International Energy Agency (IEA), International Renewable Energy Agency (IRENA), and the United Nations Environment Programme (UNEP). Academic journal articles (e.g., Park, Kim, & Roh, 2020), specialized policy briefs (e.g., Michel, 2024), and industry analyses further enrich the data set. The analytical framework employed is a thematic synthesis. Evidence from these diverse sources is systematically collated, coded, and integrated to construct a coherent and evidence-based argument. This approach allows for the identification of recurring themes, such as policy institutionalization, national potential versus systemic barriers, and the role of international cooperation, enabling a nuanced exploration of the research questions.

Result and Discussion

The transition to a green economy in the Indo-Pacific is a complex phenomenon from ambitious national strategies, immense resource potential, and profound structural challenges. This section dissects this complexity by first examining the institutionalized policy models of Japan and South Korea, then focusing on Indonesia as a critical case study of the region's paradoxes, and finally synthesizing these analyses to chart a path forward.

Comparative Policy Models in the Indo-Pacific

Advanced economies in the region, notably Japan and South Korea, have moved beyond conceptual discourse to institutionalize the green transition through comprehensive, state-led industrial policies. These strategies, while differing in their specifics, provide important benchmarks for national commitment and policy design.

Japan's Green Growth Strategy (GGS)

In October 2020, Japan declared its intention to achieve carbon neutrality by 2050, positioning this challenge as the core of its national growth strategy (Ministry of Economy, Trade and Industry, 2020). The resulting Green Growth Strategy (GGS) is an ambitious industrial policy designed to create a "virtuous cycle of economic growth and environmental protection" (METI, 2021). The GGS identifies **14 high-growth potential sectors** as pillars of this transformation, including offshore wind power, hydrogen and ammonia fuels, next-generation thermal energy, automobiles and storage batteries, semiconductors, shipping, and carbon recycling (METI, 2021).

To propel these sectors forward, the government has mobilized a full suite of policy tools. The centerpiece is a **JPY 2 trillion (approximately USD 18 billion) Green Innovation Fund**, designed to provide stable, long-term support for corporate R&D, demonstration projects, and social implementation over a ten-year period (METI, 2021). This public funding is intended to stimulate over JPY 15 trillion in private investment (METI, 2020). The fund is complemented by tax incentives for decarbonization investments, significant regulatory reforms, and a focus on international collaboration to establish global standards and markets for new green technologies (METI, 2021).

However, the implementation of the GGS reveals a significant gap between ambition and action. The Climate Action Tracker (CAT) rates Japan's overall climate targets and action as "Insufficient," projecting that current policies will lead to emission reductions of only 31% to 38% by 2030 (below 2013 levels), falling short of its 42% NDC target (Climate Action Tracker, 2024). Critics point to the strategy's heavy reliance on costly and unproven technologies, such as ammonia co-firing in coal power plants, which risks prolonging the life of fossil fuel infrastructure rather than replacing it (Climate Action Tracker, 2024). Furthermore, a major policy reversal under the "Green Transformation (GX) Basic Policy" involves restarting idled nuclear reactors and developing next-generation nuclear plants, signaling a continued dependence on legacy energy systems alongside new green initiatives (Climate Action Tracker, 2024).

South Korea's Green New Deal (GND)
Announced in July 2020, South Korea's Green New Deal (GND) was conceived as a cornerstone of the nation's post-COVID-19 economic recovery. It is a comprehensive strategy to transition the country to a low-carbon economy while simultaneously creating jobs and strengthening the social safety net (Kim et al., 2020). The plan involves a total investment of KRW 73.4 trillion (approximately USD 62 billion) in the green sector, with the goal of creating over 659,000 jobs by 2025 (Ministry of Economy and Finance, 2020).
The GND is structured around three core pillars:

1. **Green Transition of Infrastructures**, which includes projects like retrofitting public buildings for energy efficiency;
2. **Low-carbon and Decentralized Energy**, focused on massively expanding renewable energy generation and building smart grids; and
3. **Innovation in Green Industry**, aimed at supporting SMEs and establishing green industrial complexes (Park, Kim, & Roh, 2020).

A key feature of the GND is its tight integration with a parallel "Digital New Deal," which leverages artificial intelligence (AI) and ICT to create smart energy management systems, smart factories, and digital twins of national infrastructure, thereby enhancing efficiency and accelerating decarbonization (International Energy Agency, 2020). Key targets include expanding renewable capacity from 12.7 GW in 2019 to 42.7 GW by 2025, putting 1.13 million electric vehicles (EVs) and 200,000 hydrogen vehicles on the road, and installing smart meters in five million apartments (Kim et al., 2020).

Like Japan's GGS, the Korean GND has faced criticism and policy shifts. While praised for its scale and innovative integration of green and digital goals, analysts have raised concerns about its significant reliance on liquefied natural gas (LNG) as a "bridging fuel," which could lock in fossil fuel emissions and infrastructure for decades (Kim et al., 2020). More significantly, the administration that took office in 2022 has revised the country's energy strategy, deprioritizing renewable energy targets in favor of an expanded role for nuclear power, as reflected in the 10th Basic Electricity Plan (Climate Action Tracker, 2023). This has led the CAT to rate South Korea's overall climate action as "Highly Insufficient," indicating that its policies are not aligned with the Paris Agreement's 1.5°C goal (Climate Action Tracker, 2023).

The highly structured and well-funded industrial policies of Japan and South Korea stand as powerful models for how nations can institutionalize a green transition agenda. They demonstrate a clear, top-down commitment to transforming key sectors of the economy. Yet, a closer examination of their implementation reveals a fundamental paradox. Despite the ambitious rhetoric and massive financial outlays, the actual policy choices often betray a reluctance to enact the deep, disruptive changes required for a true transformation. The strategies in both countries are projected to fall short of their 2030 climate targets (Climate Action Tracker, 2023; 2024). This is not simply a matter of technical difficulty or insufficient funding; it reflects a deeper political-economic reality. Key decisions such as Japan's promotion of "clean coal" technologies like ammonia co-firing and both nations' renewed embrace of nuclear power at the expense of more aggressive renewable deployment suggest that the primary goal is often to layer a "green" dimension onto the existing economic structure rather than to fundamentally re-engineer it (Climate Action Tracker, 2023; 2024). This approach prioritizes the stability of incumbent industries and traditional notions of energy security over the rapid, and potentially disruptive, phase-out of fossil fuels. The green transition, therefore, emerges not as a linear technical process, but as a deeply contested political negotiation, where stated climate ambitions clash with the powerful inertia of entrenched interests. This dynamic in advanced economies provides a crucial lens for understanding the even greater challenges confronting a developing nation like Indonesia.

Tabel 1: Comparative Analysis of Indo-Pacific Green Economy Policies

Country	Policy Name	Key Objective	Total Investment	Key Targets/Focus Areas
Japan	Green Growth Strategy (GGS)	Achieve carbon neutrality by 2050 through a "virtuous cycle of economy and environment."	JPY 2 trillion (approx. USD 18B) from Green Innovation Fund, aiming to stimulate JPY 15T in private investment.	14 priority sectors including offshore wind, hydrogen/ammonia, batteries, carbon recycling, and nuclear power. (METI, 2021a)
South Korea	Green New Deal (GND)	Post-COVID economic recovery and transition to a low-carbon, sustainable economy.	KRW 73.4 trillion (approx. USD 62B) by 2025.	Green infrastructure, decentralized renewable energy, green industry innovation, 1.13M EVs by 2025, integration with Digital New Deal. (MOEF, 2020; Kim et al., 2020)
Indonesia	Just Energy Transition Partnership (JETP)	Accelerate a just and affordable power sector transition away from fossil fuels.	USD 20 billion in initial mobilized public and private finance.	Cap power sector emissions at 250 MT CO2 by 2030, achieve 44% renewable energy share by 2030, early coal retirement, grid expansion. (JETP Indonesia Secretariat, 2025)

Indonesia as a Focal Point: Potential and Paradox

Indonesia represents the quintessential case of the green economy paradox. It is a nation endowed with world-class natural resources that position it to be a global leader in the transition, yet it is simultaneously constrained by a web of deep-seated structural impediments that have kept this potential largely untapped.

Superpower in Renewable and Mineral Resources

Indonesia's potential contribution to the global green economy is staggering, resting on two main pillars: its vast renewable energy sources and its dominance in critical minerals. The country possesses one of the world's largest and most diverse renewable energy resource bases. Official estimates of this potential vary but consistently point to an immense, largely unexploited endowment. The potential for solar power is estimated to be between **207.8 GW** and a colossal **3,294 GW** (Ridwan et al., 2023; Tempo.co, 2024). Hydropower potential is pegged at **75 GW** to **95 GW** (Ridwan et al., 2023; Tempo.co, 2024), while geothermal resources stemming from the country's position on the "Ring of Fire" offer a potential of **23 GW** to **29 GW** (Tempo.co, 2024; Ridwan et al., 2023). Beyond these, there are significant opportunities in bioenergy (57 GW), wind (155 GW), and entirely untapped ocean energy (63 GW) (Tempo.co, 2024). This combined potential is more than sufficient to meet Indonesia's domestic energy needs, which are projected to grow fivefold by 2050 (International Renewable Energy Agency, 2022), and could position the country as a major clean energy exporter.

Complementing this energy potential is Indonesia's strategic dominance in critical minerals essential for green technologies. The country holds the world's largest nickel reserves, accounting for between 21% and 42% of the global total (Rakhmat & Purnama, 2023; Michel, 2024), and is already the world's largest producer, supplying nearly half of the global market in 2023 (Ravi, 2024). Recognizing the mineral's crucial role in EV batteries, the Indonesian government has implemented an aggressive "downstreaming" industrial strategy. This policy uses a ban on the export of raw nickel ore to compel domestic processing, thereby capturing more value within the country (Center for Strategic and International Studies, 2021). The strategy has been remarkably successful in attracting over USD 30 billion in foreign investment, predominantly from Chinese firms, to build a sprawling network of smelters and refineries (CSIS, 2021). This positions Indonesia not merely as a raw material supplier but as a potential integrated hub in the global EV battery supply chain, a cornerstone of its "Golden Indonesia 2045" vision (New Zealand Ministry of Foreign Affairs and Trade, 2024; CSIS, 2021). The chasm between this immense potential and the current reality is stark, as illustrated below.

Tabel 2: Indonesia's Renewable Energy Potential vs. Current Utilization

Energy Source	Estimated Potential (GW)	Utilized Capacity (GW)	Utilization Rate (%)
Solar	3,294	0.728	0.022%
Hydro	95	6.698	7.05%
Geothermal	23	2.597	11.29%
Wind	155	0.152	0.098%
Bioenergy	57	3.426	6.01%
Ocean	63	0	0%
Total	**3,687**	**13.601**	**~0.37%**
Source: Data synthesized from Ministry of Energy and Mineral Resources (ESDM) reports (Tempo.co, 2024).			

As Table 2 dramatically illustrates, Indonesia is currently utilizing less than half of one percent of its total renewable energy potential. This enormous gap begs the question: what systemic barriers are preventing the nation from converting its natural wealth into a green economic reality?

Key Challenges: Confronting Systemic and Structural Barriers

The failure to harness this potential stems from a complex interplay of infrastructural, financial, and policy-related barriers that are deeply embedded in Indonesia's political economy.

A primary and critical bottleneck is the country's **infrastructure deficit**. Indonesia suffers from a staggering USD 1.5 trillion infrastructure gap when compared to its emerging economy peers (World Bank, 2019). In the energy sector, this manifests as an inadequate and antiquated electricity grid that is ill-equipped to handle the intermittency of variable renewable energy (VRE) sources like solar and wind (Mongabay, 2025; Energy Monitor, 2025). This technical limitation forces a continued reliance on dispatchable fossil fuel power plants to maintain grid stability. The nation's archipelagic geography, with over 17,000 islands, further complicates matters, necessitating massive investments in subsea transmission cables and smart grid technologies to create an integrated national network a stated priority that remains severely underfunded (Mahendra, 2023; MFAT, 2024).

This infrastructure gap is compounded by a **challenging investment climate**. Despite reforms such as the 2023 Omnibus Law on Job Creation, foreign investors consistently cite bureaucratic inefficiency, a lack of regulatory certainty, weak contract enforcement, and delays in land acquisition as significant deterrents (U.S. Department of State, 2024; Sujai et al., 2023). The financial ecosystem for green projects is nascent; green loans account for a mere 2% of commercial bank lending portfolios (World Bank, 2021), and the financing required to meet climate and development goals runs into the trillions of dollars (Observer Research Foundation, 2025). Policies designed to foster domestic industry, such as stringent local content requirements (LCRs) for renewable energy projects, can inadvertently increase project costs and complexity, further discouraging private investment (Mahendra, 2023; World Bank, 2021). Perhaps the most formidable barrier is Indonesia's **entrenched dependency on fossil fuels**. The energy system is dominated by coal, which accounts for over 62% of electricity generation and 40% of the primary energy mix (Climate Transparency, 2024; Ministry of Energy and Mineral Resources, 2024). Far from being phased out, coal production has increased by over 770% since 2000 (IEA, 2023). This dependency is artificially sustained by pervasive energy subsidies, which are a major feature of the global economy but are particularly problematic in Indonesia (International Monetary Fund, 2022). These subsidies, which cost the state nearly 3% of GDP in 2022, make fossil fuels artificially cheap, distorting the market against renewables and consuming fiscal space that could be used for green investments (World Bank, 2022). Despite numerous reform attempts, they remain a central and politically sensitive policy challenge. The state-owned utility, PT Perusahaan Listrik Negara (PLN), is financially hobbled by long-term power purchase agreements (PPAs) with coal producers and relies on over USD 8 billion in annual government subsidies and compensation, severely limiting its ability to spearhead the transition (Yustika, 2025). Consequently, PLN has a consistent track record of failing to meet its own renewable energy deployment targets (Yustika, 2025; Mongabay, 2025).

This confluence of challenges is vividly encapsulated in the country's flagship nickel downstreaming strategy. While the policy is aimed at a "green" outcome supplying the global EV battery market it is being executed with decidedly "brown" methods. The energy-intensive smelting and refining processes are powered almost exclusively by a fleet of captive coal-fired power plants built alongside the industrial parks (Michel, 2024). This makes Indonesian nickel among the most carbon-intensive in the world, directly contradicting the country's emissions reduction commitments under its Nationally Determined Contribution (NDC) and the JETP (Michel, 2024; Ravi, 2024). This industrial model has also created severe negative externalities, including widespread deforestation, soil and water pollution, the displacement of Indigenous communities, and the emergence of a two-tiered labor market that often marginalizes local workers (Ravi, 2024; Lowy Institute, 2024). This "dirty" production process is now attracting international scrutiny. The United States has classified parts of the industry as engaging in forced labor, and European firms are increasingly hesitant to invest or source from supply chains that fail to meet high Environmental, Social, and Governance (ESG) standards (Lowy Institute, 2024). This creates a profound geopolitical risk: Indonesia's premier green-tech export could be locked out of key Western markets, potentially stranding billions in investment and creating a new form of dependency on markets with less stringent standards.

Tabel 3: Key Challenges to Indonesia's Green Transition

Barrier Category	Specific Challenge	Key Evidence/Data Point
Infrastructural	Inadequate and fragmented electricity grid.	USD 1.5 trillion national infrastructure deficit; grid unable to integrate high shares of variable renewables. (World Bank, 2019; Mongabay, 2025)
Financial	Insufficient investment and challenging climate.	Green loans are only 2% of bank portfolios; investors cite bureaucratic inefficiency and regulatory uncertainty. (U.S. Department of State, 2024; World Bank, 2021)
Policy & Regulatory	Pervasive fossil fuel subsidies.	Subsidies cost 2.8% of GDP in 2022, distorting the market and disincentivizing renewables. (World Bank, 2022)
	State utility (PLN) financial constraints.	PLN required USD 8 billion in government support in 2022; poor track record on RE targets. (Yustika, 2025)
	Conflicting industrial and environmental goals.	Nickel downstreaming is powered by captive coal plants, creating high carbon intensity and ESG risks. (Michel, 2024; Lowy Institute, 2024)
Social & Environmental	Negative externalities of resource extraction.	Deforestation, pollution, and displacement of communities linked to nickel mining. (Michel, 2024; Lowy Institute, 2024)

Path Forward to the Transition

Navigating Indonesia's complex transition requires a concerted effort that addresses these interlocking barriers simultaneously. The primary international mechanism designed for this purpose is the Just Energy Transition Partnership (JETP), which represents a new model of climate finance and policy cooperation. Launched in 2022, the JETP is a landmark agreement between Indonesia and a coalition of developed nations (the International Partners Group, or IPG) to mobilize an initial **USD 20 billion** in blended public and private finance (JETP Indonesia Secretariat, 2025). Its core objective is to accelerate a just and affordable transition of Indonesia's power sector. The partnership's roadmap is the **Comprehensive Investment and Policy Plan (CIPP)**, a "living document" intended to guide investments and reforms (JETP Indonesia Secretariat, 2025). The CIPP sets ambitious new targets, including capping power sector emissions at 250 million tons of CO2 (down from a 305 MT baseline) and achieving a 44% share of renewables in the on-grid generation mix by 2030 (U.S. Embassy & Consulates in Indonesia, 2023). It identifies five key investment focus areas: transmission network development, early coal-fired power plant retirement, dispatchable renewables (hydro, geothermal), variable renewables (solar, wind), and the development of a domestic renewable energy supply chain (Mahendra, 2023).

The JETP framework directly targets many of the hurdles identified previously, providing capital for grid expansion and a policy dialogue for subsidy reform and improving PLN's financial health. However, the scale of the challenge remains immense. The initial USD 20 billion, to be mobilized over three to five years, represents only a fraction of the total investment required. Estimates suggest Indonesia needs at least USD 97.3 billion by 2030 and over USD 580 billion by 2050 to fully fund its power sector transition, meaning the JETP covers only about 3% of the long-term need (Germanwatch, 2023). This highlights that the JETP is intended as a catalyst to de-risk the market and unlock much larger flows of private capital, rather than a comprehensive funding solution in itself. The success of this endeavor is not merely a domestic affair but is deeply embedded in the geopolitics of the global energy transition. The Indo-Pacific is not a collection of isolated national projects but a deeply interconnected and politically charged arena. Cooperation is essential, as demonstrated by mechanisms like the JETP and other International Green Economy Collaborations (IGECs) that facilitate finance, technology transfer, and policy coordination (Aisbett et al., 2023). However, this cooperation unfolds amidst fierce geoeconomic competition. A global race is underway for dominance in green technology manufacturing and critical mineral supply chains, where China has established a formidable position (Lowy Institute, 2024). Policy shifts in major powers, such as the United States' Inflation Reduction Act or potential changes in its commitment to international climate agreements, create significant uncertainty and risk for the entire region (Nedopil et al., 2025; Michel, 2024). Indonesia sits at the nexus of this dynamic, attempting a delicate balancing act. It leverages its nickel wealth to attract vast sums of Chinese investment for industrialization while simultaneously partnering with the West through the JETP to secure financing and technical support for its energy sector decarbonization (CSIS, 2021; U.S. Embassy & Consulates in Indonesia, 2023). This strategy requires "sensitive energy diplomacy" to navigate conflicting standards and avoid becoming caught in the crossfire of great power rivalry (Council on Energy, Environment and Water, 2023). A resilient transition, therefore, depends on building diversified regional frameworks that can withstand these geopolitical shocks.

Finally, a technologically and financially sound transition will fail if it is not socially and politically sustainable. The concept of a "just transition" must be more than an afterthought; it must be a core principle guiding every policy decision. The JETP's own framework explicitly recognizes this, incorporating pillars for human rights, gender equality, and accountability, and emphasizing the need to leave no one behind (Germanwatch, 2023). This requires concrete action: targeted public and private investment in human capital through education and vocational training to equip the workforce for the green jobs of the future (Park, Kim, & Roh, 2020). It also demands the creation of robust social safety nets and alternative livelihood programs to support workers and communities that are currently dependent on the fossil fuel industry, ensuring that the benefits of the new green economy are distributed equitably and that a broad base of public support for the long and difficult transition is maintained (Lowy Institute, 2024).

Conclusion

The global imperative for a green economy transition finds its most critical and complex expression in the Indo-Pacific. This paper has demonstrated that while advanced economies like Japan and South Korea offer robust models for institutionalizing green industrial policy, their progress is tempered by the inertia of entrenched political-economic interests. Indonesia, as the central case study, embodies the region's defining paradox: a nation of world-class renewable energy and critical mineral potential whose path to a green future is obstructed by systemic barriers in infrastructure, finance, and policy. This is further complicated by the pursuit of green economic goals, such as leadership in the EV battery supply chain, through carbon-intensive industrial methods that generate significant negative externalities and geopolitical risks. The central challenge is clear: the question is no longer *if* the transition should occur, but *how* and *how fast* it can be achieved in a just, viable, and resilient manner. Based on this analysis, the following strategic recommendations are proposed:

1. **Accelerate and De-risk Investment:** The immense financing gap is the most immediate barrier. Indonesia must aggressively implement the policy reforms outlined in the JETP's Comprehensive Investment and Policy Plan to create a more stable and attractive environment for private capital. This requires prioritizing the reform of energy subsidies to eliminate market distortions (World Bank, 2022), strengthening the financial sustainability of the state utility PLN to make it a credible partner for investment (Yustika, 2025), and streamlining bureaucratic and regulatory processes to reduce uncertainty for both domestic and international investors (Mahendra, 2023.; U.S. Department of State, 2024).
2. **Foster Cross-Border Policy Synergy and Resilience:** The green transition is a regional and global endeavor that cannot be achieved in isolation. Nations in the Indo-Pacific should move beyond ad-hoc partnerships to build more formalized regional frameworks for cooperation. This includes working towards the harmonization of carbon market standards to create larger, more liquid markets

(Nedopil et al., 2025); establishing technological alliances for joint R&D and resource sharing, particularly in areas like grid technology and energy storage (Nedopil et al., 2025); and collaborating to build diversified, secure, and ESG-compliant green supply chains to mitigate geopolitical risks and reduce over-dependence on any single nation for critical technologies or minerals (Aisbett et al., 2023; ORF, 2025).

3. **Prioritize Human Capital and a Just Transition:** A successful transition must be socially equitable to be politically durable. The principles of a "just transition" must be embedded in all policy-making (Germanwatch, 2023). This demands a massive, coordinated investment in human capital, including upskilling and reskilling programs to prepare the workforce for emerging green industries. Furthermore, dedicated funds and programs must be established to support communities and workers transitioning away from fossil fuel sectors, providing social safety nets, alternative livelihood opportunities, and ensuring that the economic benefits of the green economy are shared broadly across society (Lowy Institute, 2024).

This proactive approach is essential for building the enduring public consensus needed to navigate the profound changes ahead.

References

Agence Française de Développement. (2024). *Overcoming economic and climate challenges with sustainable finance in the Indo-Pacific*. Retrieved August 18, 2025, from https://www.afd.fr/en/actualites/overcoming-economic-and-climate-challenges-sustainable-finance-indo-pacific

Aisbett, E., Roberts, A., Hughes, L., Downie, C., Drysdale, P., Morgan, W., & Jotzo, F. (2023, February 4). *International Green Economy Collaborations (IGECs): An emerging tool of green industrial and trade policy*. Australian National University. https://iceds.anu.edu.au/files/AE%20manuscript%20Aisbett%204Feb23%20v2%20formatted_0.pdf

Asian Development Bank. (2024). *ADB's Work in Indonesia*. https://www.adb.org/where-we-work/indonesia/overview

Bowen, J. (2022). *Enhancing Clean Energy Cooperation in the Indo-Pacific*. The National Bureau of Asian Research. Retrieved August 18, 2025, from https://www.nbr.org/publication/enhancing-clean-energy-cooperation-in-the-indo-pacific/

Center for Strategic and International Studies. (2021, December 8). *Indonesia's nickel industrial strategy*. https://www.csis.org/analysis/indonesias-nickel-industrial-strategy

Climate Action Tracker. (2023). *South Korea*. https://climateactiontracker.org/countries/south-korea/

Climate Action Tracker. (2024, November 4). *Japan: Policies & action*. https://climateactiontracker.org/countries/japan/policies-action/

Climate Transparency. (2024, January). *Implementation check: Renewable energy development in Indonesia*. https://www.climate-transparency.org/wp-content/uploads/2024/01/Implementation-Check-Renewable-Energy-Development-in-Indonesia-2024.pdf

Council on Energy, Environment and Water. (2023). *Accelerating the Indo-Pacific's energy transition: The need for concerted financial and multilateral action*. Retrieved August 18, 2025, from https://www.ceew.in/sites/default/files/CEEW-Research-On-Accelarating-Indo-Pacific-Energy-Transition.pdf

Energy Monitor. (2025, April 29). *Insufficient grid investment impedes Asia-Pacific energy transition: ADB*. https://www.energymonitor.ai/news/insufficient-grid-investment-asia-pacific-adb/

European Environment Agency. (2011). *Europe's environment – The Assessment of Assessments*. https://www.eea.europa.eu/en/analysis/publications/europes-environment-aoa/chapter3.xhtml

Germanwatch. (2023). *The role of the Just Energy Transition Partnerships in Indonesia*. https://www.germanwatch.org/sites/default/files/germanwatch_the_role_of_the_just_energy_transition_partnerships_in_indonesia_2024.pdf

International Energy Agency. (2020). *Korean New Deal: Digital New Deal, Green New Deal, and Stronger Safety Net*. https://www.iea.org/policies/11514-korean-new-deal-digital-new-deal-green-new-deal-and-stronger-safety-net

International Energy Agency. (2023). *Indonesia*. https://www.iea.org/countries/indonesia

International Monetary Fund. (2022). *Fossil fuel subsidies*. Retrieved August 18, 2025, from https://www.imf.org/en/Topics/climate-change/energy-subsidies

International Renewable Energy Agency. (2022, October 21). *Renewable pathway more cost-effective than fossil fuels in Indonesia* [Press release]. https://www.irena.org/News/pressreleases/2022/Oct/Renewable-Pathway-More-Cost-Effective-than-Fossil-Fuels-in-Indonesia

JETP Indonesia Secretariat. (2025). *Just Energy Transition Partnership Indonesia*. https://jetp-id.org/

Kim, S.-Y., Thurbon, E., Tan, H., & Mathews, J. (2020, September 11). *South Korea's Green New Deal shows the world what a smart economic recovery looks like*. UNSW Newsroom. https://www.unsw.edu.au/newsroom/news/2020/09/south-korea-s-green-new-deal-shows-the-world-what-a-smart-econom

Lowy Institute. (2024). *Indonesia's downstreaming dilemma*. The Interpreter. https://www.lowyinstitute.org/the-interpreter/indonesia-downstreaming-dilemma

Mahendra, E. (2023). *Energy Transition Mechanism (ETM) in Indonesia* [Presentation]. Asian Development Bank. https://www.adb.org/sites/default/files/event/906146/files/14-40-edo-mahendra-etm-indonesia-eng-rev.pdf

Michel, L. (2024). *Prospects for Indonesia's nickel boom amidst the systemic challenge of coal*. Institut français des relations internationales. https://www.ifri.org/sites/default/files/migrated_files/documents/atoms/files/ifri_michel_indonesia_nickel_boom_2024.pdf

Ministry of Economy and Finance. (2020, July 28). *Government releases an English booklet on the Korean New Deal*. https://english.moef.go.kr/pc/selectTbPressCenterDtl.do?boardCd=N0001&seq=4948

Ministry of Economy, Trade and Industry. (2020, December 25). *"Green Growth Strategy in line with carbon neutrality to be achieved by 2050" formulated*. https://www.meti.go.jp/english/press/2020/1225_001.html

Ministry of Economy, Trade and Industry. (2021a). *Green Growth Strategy through achieving carbon neutrality in 2050*. https://www.meti.go.jp/english/policy/energy_environment/global_warming/ggs2050/index.html

Ministry of Economy, Trade and Industry. (2021b, September 16). *Japan's Green Growth Strategy will accelerate innovation*. Japan.go.jp. https://www.japan.go.jp/kizuna/2021/09/green_growth_strategy.html

Ministry of Energy and Mineral Resources. (2024). *Handbook of energy & economic statistics of Indonesia 2024*. https://www.esdm.go.id/assets/media/content/content-handbook-of-energy-and-economic-statistics-of-indonesia-2024.pdf

Mongabay. (2025, June). *Indonesian utility PLN kneecaps renewables with embrace of fossil fuels*. https://news.mongabay.com/2025/06/indonesian-utility-pln-kneecaps-renewables-with-embrace-of-fossil-fuels/

Nedopil, C., Purkayastha, D., Mallya, H., Vij, K., Bassi, N., & Raha, S. (2025, March 12). *Time to develop an Asia-Pacific Green Development Agenda*. Griffith Asia Institute. https://blogs.griffith.edu.au/asiainsights/time-to-develop-an-asia-pacific-green-development-agenda/

New Zealand Ministry of Foreign Affairs and Trade. (2024, September). *Indonesia: Green economy*. https://www.mfat.govt.nz/en/trade/mfat-market-reports/indonesia-green-economy-september-2024

Observer Research Foundation. (2025). *IBSA and Indonesia: A partnership for energy transitions*. Retrieved August 18, 2025, from https://www.orfonline.org/public/uploads/upload/20250803124421.pdf

Park, J., Kim, J., & Roh, T. (2020). South Korea's Green New Deal: A sociotechnical assessment. *Sustainability, 12*(23), 10191. https://doi.org/10.3390/su122310191

Pearce, D., Markandya, A., & Barbier, E. B. (1989). *Blueprint for a green economy*. Earthscan Publications.

Rakhmat, M. Z., & Purnama, Y. (2023). Indonesia's downstreaming policy as a new developmental state model. *Journal of ASEAN Studies, 11*(1), 76-93.

Ravi, A. (2024, November 1). *3 Questions: Can we secure a sustainable supply of nickel?* MIT News. https://news.mit.edu/2024/3-questions-can-we-secure-sustainable-supply-nickel-1101

Ridwan, R., Muhtadin, A. F., Prakoso, T., Septiadi, W. N., & Sasongko, N. A. (2023). Renewable and sustainable energy in Indonesia: Current status, potentials, and future projections. *Sustainability, 15*(3), 2342. https://doi.org/10.3390/su15032342

Sujai, M., Yusgiantoro, F. C., & Adhiguna, P. (2023). *Phasing out coal-fired power plants in Indonesia: Challenges and policy recommendations* (ADBI Working Paper 1416). Asian Development Bank Institute. https://www.adb.org/sites/default/files/publication/915336/adbi-wp1416.pdf

Tempo.co. (2024). *Indonesia's renewable energy utilization very low at just 0.3%: Energy Ministry*. https://en.tempo.co/read/1952051/indonesias-renewable-energy-utilization-very-low-at-just-0-3-energy-ministry

U.S. Department of State. (2024). *2024 Investment climate statements: Indonesia*. https://www.state.gov/reports/2024-investment-climate-statements/indonesia

U.S. Embassy & Consulates in Indonesia. (2023). *Indonesia Just Energy Transition Comprehensive Investment and Policy Plan launched*. Retrieved August 18, 2025, from https://id.usembassy.gov/indonesia-just-energy-transition-comprehensive-investment-and-policy-plan-launched/

United Nations Environment Programme. (2011). *Towards a green economy: Pathways to sustainable development and poverty eradication*. https://www.unep.org/resources/report/towards-green-economy-pathways-sustainable-development-and-poverty-eradication

World Bank. (2019). *Indonesia country program evaluation approach paper*. Independent Evaluation Group. https://ieg.worldbankgroup.org/reports/indonesia-country-program-evaluation-approach-paper

World Bank. (2021). *Greening the private sector to support Indonesia's climate and development goals*. https://documents1.worldbank.org/curated/en/099105003092397820/P1794330b9a9730d0b485070d09515deea.docx

World Bank. (2022). *Reforming Indonesia's fuel subsidies*. https://documents1.worldbank.org/curated/en/099748505212431959/pdf/IDU1e31e5e531f16114baa1b62c1b3201c9c2e68.pdf

World Bank. (2023). *Indonesia country climate and development report*. Retrieved August 18, 2025, from https://www.worldbank.org/en/country/indonesia/publication/indonesia-country-climate-and-development-report

Yustika, M. (2025). *Pathways to financial sustainability for PLN through renewable energy development*. Institute for Energy Economics and Financial Analysis. https://ieefa.org/resources/pathways-financial-sustainability-pln-through-renewable-energy-development

.